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FILE 'HOME' ENTERED AT 09:28:46 ON 23 JUN 2004

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FILE 'BIOSIS' ENTERED AT 09:30:24 ON 23 JUN 2004
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=> s phytase
L1         4493 PHYTASE

=> s l1 and yersinia pestis
L2            1 L1 AND YERSINIA PESTIS

=> d ti

L2   ANSWER 1 OF 1  CAPLUS  COPYRIGHT 2004 ACS on STN
TI   New phytases identified by sequence homology and their use in food
     processing to lower phytic acid content


=> d so

L2   ANSWER 1 OF 1  CAPLUS  COPYRIGHT 2004 ACS on STN
SO   PCT Int. Appl., 208 pp.
     CODEN: PIXXD2


=> d pi

L2   ANSWER 1 OF 1  CAPLUS  COPYRIGHT 2004 ACS on STN
     PATENT NO.         KIND  DATE           APPLICATION NO.  DATE
     ---------------    ----  --------       ---------------  --------
PI   WO 2002048332      A2    20020620       WO 2001-US48774  20011212
     WO 2002048332      C2    20030424
     WO 2002048332      A3    20030626
         W:  AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN,
             CO, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM,
             HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS,
             LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO,
             RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN,
             YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM
         RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, CH,
             CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR,
             BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG
     AU 2002030953      A5    20020624       AU 2002-30953    20011212
     US 2003101476      A1    20030529       US 2001-21723    20011212


=> s l1 and (cdna or gene or coding region)
L3          482 L1 AND (CDNA OR GENE OR CODING REGION)

=> s l3 and food composition
L4            0 L3 AND FOOD COMPOSITION

=> s l3 and food
L5           73 L3 AND FOOD

=> s l3 and synthetic
L6           35 L3 AND SYNTHETIC

=> dup rem l6
PROCESSING COMPLETED FOR L6
L7           28 DUP REM L6 (7 DUPLICATES REMOVED)

=> d 1-10 ti

L7   ANSWER 1 OF 28  CAPLUS  COPYRIGHT 2004 ACS on STN
TI   Isolation, characterization, and molecular cloning of the cDNA
```

encoding a novel **phytase** from Aspergillus niger 113 and high expression in Pichia pastoris

L7 ANSWER 2 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN
TI Thermotolerant **phytase** expression in plants and isolation for use in animal feed and food processing

L7 ANSWER 3 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN
TI Constitutive promoters of Arabidopsis and their use in expression of foreign genes in transgenic plants

L7 ANSWER 4 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN
TI Production, expression and sequence of modified recombinant Escherichia coli **phytase** with enhanced thermostability and proteolytic resistance for use in foodstuffs

L7 ANSWER 5 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN
TI Continuous fermentation system and production of engineered phytases with improved thermostability

L7 ANSWER 6 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN
TI Constitutive promoters of Arabidopsis and their use in expression of foreign genes in transgenic plants

L7 ANSWER 7 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 1
TI Fungal phyA **gene** expressed in potato leaves produces active and stable **phytase**

L7 ANSWER 8 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN
TI Engineering the root-soil interface via targeted expression of a **synthetic phytase gene** in trichoblasts

L7 ANSWER 9 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN
TI A flocculation-centrifugation method of purifying α-amylase, cellulase and other enzymes, and design of α-amylase with increased activity and stability

L7 ANSWER 10 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN
TI Sequences of myo-inositol oxygenases for the production of glucuronic acids, ascorbic acids, and glucaric acids

=> d 1-2 ab

L7 ANSWER 1 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN
AB Phytases catalyze the release of phosphate from phytic acid. **Phytase**-producing microorganisms were selected by culturing the soil exts. on agar plates containing phytic acid. Two hundred colonies that exhibited potential **phytase** activity were selected for further study. The colony showing the highest **phytase** activity was identified as Aspergillus niger and designated strain 113. The **phytase gene** from A. niger 113 (phyI1) was isolated, cloned, and characterized. The nucleotide and deduced amino acid sequence identity between phyI1 and phyA from NRRL3135 were 90% and 98%, resp. The identity between phyI1 and phyA from SK-57 was 89% and 96%. A **synthetic phytase gene**, phyI1s, was synthesized by successive PCR and transformed into the yeast expression vector carrying a signal peptide that was designed and synthesized using P. pastoris biased codon. For the **phytase** expression and secretion, the construct was integrated into the genome of P. pastoris by homologous recombination. Over-expressing strains were selected and fermented. It was discovered that .apprx.4.2 g **phytase** could be purified from one liter of culture fluid. The activity of the resulting **phytase** was 9.5 U/mg. Due to the heavy glycosylation, the

expressed **phytase** varied in size (120, 95, 85, and 64 kDa), but could be deglycosylated to a homogeneous 64 kDa species. An enzymic kinetics anal. showed that the **phytase** had two pH optima (pH 2.0 and pH 5.0) and an optimum temperature of 60°C.

L7 ANSWER 2 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN
AB The invention provides a **synthetic phytase** polynucleotide which is optimized for expression in plants and which encodes at thermotolerant **phytase**, as well as isolated thermotolerant **phytase** enzyme. Also provided are feed or food products comprising a thermotolerant **phytase**, and transgenic plants which express the thermotolerant **phytase**. Further provided are methods for making and using thermotolerant phytases, e.g., a method of using a thermotolerant **phytase** in feed and food processing.

=> d so

L7 ANSWER 1 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN
SO Journal of Biochemistry and Molecular Biology (2004), 37(3), 282-291
CODEN: JBMBE5; ISSN: 1225-8687

=> d 2 pi

L7 ANSWER 2 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2003057248	A1	20030717	WO 2002-US41787	20021230
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
	RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
	US 2003170293	A1	20030911	US 2002-334671	20021230

=> d 4 ab

L7 ANSWER 4 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN
AB The invention provides isolated and recombinant **phytase** enzymes. In one aspect, the **phytase** is produced by modification of the wild type **gene** appA of Escherichia coli by using **gene** site-saturation mutagenesis. The nucleotide sequence and the encoded amino acid sequence of the modified E. coli **phytase** are disclosed. The enzyme has **phytase** activity and improved thermal tolerance as compared with the wild-type enzyme. In addition, the enzyme has improved protease stability at low pH. Glycosylation of the modified **phytase** provided a further improved enzyme having improved thermal tolerance and protease stability. The enzyme of the invention can be produced from recombinant host cells, namely E. coli, Pichia pastoris and Schizosaccharomyces pombe. The phytases of the invention can be used to aid in the digestion of phytate where desired. In particular, the phytases of the invention can be used in foodstuffs to improve the feeding value of phytate rich ingredients. Also provided are methods for obtaining a variant polynucleotide encoding a **phytase** and for obtaining a **phytase** with enhanced thermostability or

thermotolerance at high or low temps.

=> d 4 so

L7 ANSWER 4 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN
SO U.S. Pat. Appl. Publ., 113 pp., Cont.-in-part of U.S. Ser. No. 866,379.
CODEN: USXXCO

=> d 4 pi

L7 ANSWER 4 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2003103958	A1	20030605	US 2002-156660	20020524
	US 5876997	A	19990302	US 1997-910798	19970813
	US 6110719	A	20000829	US 1999-259214	19990301
	US 6190897	B1	20010220	US 1999-291931	19990413
	US 6183740	B1	20010206	US 1999-318528	19990525
	US 6720014	B1	20040413	US 2000-580515	20000525
	US 2002136754	A1	20020926	US 2001-866379	20010524

=> d 4 in

L7 ANSWER 4 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN
IN Short, Jay M.; Kretz, Keith; Gray, Kevin A.; Barton, Nelson R.; Garrett, James B.; O'Donoghue, Eileen; Mathur, Eric J.

=> d 5 ab

L7 ANSWER 5 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN
AB A fermentation assembly is provided comprising: (a) a vessel for culturing living cells; (b) at least two storage flasks in fluid communication with the vessel for supply of liqs. and a first transport means for transferring the liqs. from the storage flasks to the vessel; (c) individual appliances operably connected to the transport means for monitoring the supply of the contents of the storage flasks to the vessel; (d) a harvest flask in fluid communication with the vessel and a second transport means for transferring the fermentation broth from the vessel to the harvest flask; and (e) a device operably connected to the first transport means for controlling and maintaining a constant dilution rate in the vessel with varying rates of individual supply of liquid from the storage flasks to the vessel. Splitting of cultivation media used in a continuous fermentation process allows one to study the influence on growth and metabolite-production of microorganisms, and thus to determine optimal conditions for the fermentation process. Such a fermentation assembly device and process for recombinant **phytase** production by Hansenula polymorpha resulted in an optimized productivity of 0.094 g **phytase** per L per h; biomass in outflow was 56.8 g/L. The invention also relates to phytases with improved thermostability, where stabilizing amino acid mutations are introduced into a homologous protein, or the active site of a **phytase** is replaced in part or in total. Specific variants of Aspergillus fumigatus **phytase** and of consensus phytases are disclosed.

=> d 5 so

L7 ANSWER 5 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN
SO U.S., 204 pp.
CODEN: USXXAM

=> d 5 pi

L7 ANSWER 5 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 6599735	B1	20030729	US 2000-684855	20001006
	EP 1092764	A3	20040317	EP 2000-121663	20001004
	EP 1092764	A2	20010418		
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL				
	AU 2000062501	A5	20010412	AU 2000-62501	20001005
	CA 2319658	AA	20010411	CA 2000-2319658	20001006
	BR 2000005170	A	20010529	BR 2000-5170	20001010
	JP 2001145480	A2	20010529	JP 2000-311300	20001011
	CN 1303921	A	20010718	CN 2000-135543	20001011
	US 2003224491	A1	20031204	US 2003-442538	20030520

=> d 7-8 ab

L7 ANSWER 7 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 1

AB Fungal phyA **gene** from Aspergillus ficuum (niger) was cloned and expressed in potato leaves. The recombinant enzyme was stable and catalytically active. The expressed protein in the leaves of the dicotyledonous plant retained most phys. and catalytic properties of the benchmark A. ficuum **phytase**. The expressed enzyme was, however, 15% less glycosylated than the native **phytase**. The usual bi-hump pH optima profile, which is characteristic of the fungal **phytase**, was altered; however, the pH optimum at 5.0 was unchanged for phytate and at 4.0 for **synthetic** substrate p-nitrophenyl phosphate. The temperature was, however, unchanged. The expressed **phytase** was found to be as sensitive as the native enzyme to the inhibitory action of pseudo substrate, myo-inositol hexasulfate, while losing about 90% of the activity at 20 μM inhibitor concentration Similar to the benchmark **phytase**, the expressed **phytase** in leaves was completely inactivated by Arg modifier phenylglyoxal at 60 nM. In addition, the expressed **phytase** in the leaves was inhibited by antibody raised against a 20-mer internal peptide, which is present on the surface of the mol. as shown by the x-ray deduced 3D structure of fungal **phytase**. Taken together, the biochem. evidences indicate that fungal **phytase** when cloned and expressed in potato leaves produces a stable and active biocatalyst. Biofarming,' therefore, is an alternative way to produce functional hydrolytic enzymes as exemplified by the expression of A. ficuum (niger) phyA **gene** in potato leaf.

L7 ANSWER 8 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN

AB For biochem. modification of the root-soil interface, the engineered secretion of stable enzymes from trichoblasts (= root hair bearing rhizodermal cells) is proposed. As a reporter activity, we chose to express a **synthetic gene** encoding a secretory **phytase** (PHY) directed by a trichoblast-specific promoter in root hair cells of the crop plant potato. Transgenic plants, produced and secreted **phytase** in sufficient amts. to release phosphate from phytate in liquid medium. When grown in an unsterile substrate containing phytate, transgenic plants accumulated 40% more P in leaves than wild-type plants. The improved P nutrition driven by trichoblast-targeted expression and subsequent secretion of PHY illustrates the potential of using trichoblast-targeted expression of suitable enzymes for future applications in plant nutrition, phytoremediation and mol. farming.

=> d 7-8 ti

L7 ANSWER 7 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 1
TI Fungal phyA **gene** expressed in potato leaves produces active and stable **phytase**

L7 ANSWER 8 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN
TI Engineering the root-soil interface via targeted expression of a **synthetic phytase gene** in trichoblasts

=> d 7-8 so

L7 ANSWER 7 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 1
SO Biochemical and Biophysical Research Communications (2003), 306(2), 603-609
CODEN: BBRCA9; ISSN: 0006-291X

L7 ANSWER 8 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN
SO Plant Biotechnology Journal (2003), 1(5), 353-360
CODEN: PBJLAE; ISSN: 1467-7644

=> d 11-20 ti

L7 ANSWER 11 OF 28 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 2
TI In vitro properties of phytases from various microbial origins.

L7 ANSWER 12 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 3
TI High expression of a heat-stable **phytase** in Pichia pastoris

L7 ANSWER 13 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 4
TI The consensus concept for thermostability engineering of proteins: further proof of concept

L7 ANSWER 14 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN
TI Codon usage in methylotrophic yeasts and its use in increasing yields of foreign proteins in yeast expression hosts

L7 ANSWER 15 OF 28 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
TI Cloning and sequence analysis of the **phytase** phyA **gene** of Aspergillus niger N25.

L7 ANSWER 16 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN
TI Overexpression of artificial **synthetic gene** of Aspergillus niger NRRL3135 **Phytase** in Pichia pastoris

L7 ANSWER 17 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN
TI Transgenic animals expressing salivary proteins

L7 ANSWER 18 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN
TI Fungal phytases engineered for improved thermostability and related properties

L7 ANSWER 19 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN
TI **Phytase** consensus forms and muteins and formulations for improved thermostability

L7 ANSWER 20 OF 28 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
TI Exchanging the active site between phytases for altering the functional properties of the enzyme.

=> d 17 ab

L7 ANSWER 17 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN
AB The invention provides a transgenic animal having within its genome a transgene construct for salivary gland-specific or gastrointestinal tract-specific expression of a protein. In a preferred embodiment, the protein is a **phytase** or a homolog thereof (e.g., bifunctional **phytase**/acid phosphatase encoded by the appA **gene** of Escherichia coli) in order to enable animals to utilize available phytate in feed, thereby improving both phosphorus nutrition and decreasing environmental pollution. Such proteins may be heterologous and may be specifically expressed in the salivary gland of the animal by operably linking the nucleic acid sequence encoding the protein with regulatory sequence including a salivary gland protein promoter/enhancer. Salivary gland-specific expression also provides a means for achieving glycosylation of the recombinant protein. Promoters/enhancers specific for salivary expression include those regulating the genes encoding parotid secretory protein (PSP) of mouse, proline-rich protein (PRP) of rat, or salivary amylase. Also provided are methods of expressing and producing proteins using such nucleic acid constructs. Further, antibodies specific to such proteins and immunol. diagnostic kits are also provided.

=> d 17 pi

L7 ANSWER 17 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2000064247	A1	20001102	WO 2000-CA430	20000420
	W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
	RW: GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
	EP 1170994	A1	20020116	EP 2000-920304	20000420
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				

=> d 19 ab

L7 ANSWER 19 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN
AB A major barrier to the wide use of phytases is the constraint of thermal stability (80-120°) required for these enzymes to withstand inactivation during feed processes; the currently available industrial phrases all originate from Aspergillus niger and have low intrinsic resistance to heat inactivation. Consensus **phytase** sequences are prepared by alignment of the amino acid sequences of multiple Aspergillus, Basidiomycetes, and related fungal phytases, determination of the consensus sequence, and synthesis of a **synthetic gene** for expression of the desired consensus sequence in recombinant Aspergillus niger, Saccharomyces cerevisiae, and/or Hansenla polymorpha. Specific amino acid residues that appear associated with improved thermostability are also constructed by site-directed mutagenesis. Stabilized **phytase** formulations are disclosed with comprise **phytase** and at lease one stabilizing agent selected from the group consisting of: (a) C5 sugars such as xylitol and ribitol; (b) polyethylene glycol having a mol. weight of 600-4000 Da; (c) the disodium salts of

malonic, succinic, and glutaric acid; (d) CM-cellulose; and (e) sodium alginate. Alternatively, **phytase** may be stabilized by chemical crosslinking with either glutaraldehyde, or oxidn of **phytase** carbohydrate residues with sodium periodate and subsequent addition of adipic acid dihydrazide. Another aspect of the present invention concerns methods of preparing feed compns. for monogastric animals, whereby the feed is supplemented with a thermostabilized dry or liquid enzyme formulation.

=> d 10 so

L7 ANSWER 10 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN
SO PCT Int. Appl., 127 pp.
CODEN: PIXXD2

=> d 19 so

L7 ANSWER 19 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN
SO Eur. Pat. Appl., 103 pp.
CODEN: EPXXDW

=> d 19 pi

L7 ANSWER 19 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 969089	A1	20000105	EP 1999-111949	19990623
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
	AU 9936750	A1	20000210	AU 1999-36750	19990624
	AU 760737	B2	20030522		
	CN 1241634	A	20000119	CN 1999-108867	19990628
	KR 2000006528	A	20000125	KR 1999-24946	19990628
	BR 9903286	A	20000516	BR 1999-3286	19990628
	JP 2000053584	A2	20000222	JP 1999-184484	19990629

=> d 20 ab

L7 ANSWER 20 OF 28 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
AB By using a novel consensus approach, we have previously managed to generate a fully **synthetic phytase**, consensus **phytase**-1, that was 15-26 degreeC more thermostable than the parent fungal phytases used in its design (Lehmann et al., 2000). We now sought to use the backbone of consensus **phytase**-1 and to modify its catalytic properties. This was done by replacing a considerable part of the active site (i.e., all the divergent residues) with the corresponding residues of Aspergillus niger NRRL 3135 **phytase**, which displays pronounced differences in specific activity, substrate specificity, and pH-activity profile. For the new protein termed consensus **phytase**-7, a major-although not complete-shift in catalytic properties was observed, demonstrating that rational transfer of favorable catalytic properties from one **phytase** to another is possible by using this approach. Although the exchange of the active site was associated with a 7.6 degreeC decrease in unfolding temperature (Tm) as measured by differential scanning calorimetry, consensus **phytase**-7 still was >7 degreeC more thermostable than all wild-type ascomycete phytases known to date. Thus, combination of the consensus approach with the selection of a "preferred" active site allows the design of a thermostabilized variant of an enzyme family of interest that (most closely) matches the most favorable catalytic properties found among its family members.

=> d 20 so

L7 ANSWER 20 OF 28 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
SO Protein Science, (October, 2000) Vol. 9, No. 10, pp. 1866-1872. print.
ISSN: 0961-8368.

=> d 21-28 ti

L7 ANSWER 21 OF 28 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 5
TI The consensus concept for thermostability engineering of proteins.

L7 ANSWER 22 OF 28 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
TI Expression of Bacillus subtilis **phytase** in Lactobacillus plantarum 755.

L7 ANSWER 23 OF 28 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
TI Characterization and overproduction of the Escherichia coli appA encoded bifunctional enzyme that exhibits both **phytase** and acid phosphatase activities.

L7 ANSWER 24 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN
TI Cryptic regulatory elements obtained from plants for seed specific expression in both dicots and monocots

L7 ANSWER 25 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN
TI Thermostable phytases, genes encoding them and transgenic plants expressing the genes for use in low-phytate feed preparation

L7 ANSWER 26 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN
TI An in vivo recombination method for increased efficiency of preparation of active variants of proteins

L7 ANSWER 27 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN
TI Generation of variant polypeptides by in vivo recombination between linear DNAs

L7 ANSWER 28 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN
TI Transformation and selection of maize tissue and the regeneration of stably transformed fertile plants

=> d 21 ab

L7 ANSWER 21 OF 28 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 5
AB Previously, sequence comparisons between a mesophilic enzyme and a more thermostable homologue were shown to be a feasible approach to successfully predict thermostabilizing amino acid substitutions. The 'consensus approach' described in the present paper shows that even a set of amino acid sequences of homologous, mesophilic enzymes contains sufficient information to allow rapid design of a thermostabilized, fully functional variant of this family of enzymes. A sequence alignment of homologus fungal phytases was used to calculate a consensus **phytase** amino acid sequence. Upon construction of the **synthetic gene**, recombinant expression and purification, the first **phytase** obtained, termed consensus **phytase**

-1, displayed an unfolding temperature (Tm) of 78.0 degrees C which is 15-22 degrees C higher than the Tm values of all parent phytases used in its design. Refinement of the approach, combined with site-directed mutagensis experiments, yielded optimized consensus phytases with Tm values of up to 90.4 degrees C. These increases in Tm are due to the combination of multiple amino acid exchanges which are distributed over the entire sequence of the protein and mainly affect surface-exposed residues; each individual substitution has a rather small thermostabilizing effect only. Remarkably, in spite of the pronounced increase in thermostability, catalytic activity at 37 degrees C is not compromised. Thus, the design of consensus proteins is a potentially powerful and novel alternative to directed evolution and to a series of rational approaches for thermostability engineering of enzymes and other proteins.

=> d 21 so

L7 ANSWER 21 OF 28 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 5

SO Biochimica et biophysica acta = International journal of biochemistry and biophysics, Dec 29, 2000. Vol. 1543, No. 2. p. 408-415
Publisher: Amsterdam : Elsevier Science B.V.
CODEN: BBACAQ; ISSN: 0006-3002

=> d 25 ab

L7 ANSWER 25 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN

AB The use of thermostable phytases in the preparation of animal feed low in phytic acid is described. A thermostable **phytase** can be included feed processing before or during agglomeration and will continue to function during thermal processing of the raw material. A transgenic plant expressing the **gene** for a thermostable **phytase** may be used directly in the feed. Consensus sequences for thermostable phytases are developed using a combination of temperature optima, differential scanning calorimetry, and sequence comparison.

=> d 25 pi

L7 ANSWER 25 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI WO 9948380	A1	19990930	WO 1999-DK154	19990322
W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
RW: GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
CA 2325440	AA	19990930	CA 1999-2325440	19990322
AU 9933267	A1	19991018	AU 1999-33267	19990322
AU 753475	B2	20021017		
BR 9909006	A	20001128	BR 1999-9006	19990322
EP 1065941	A1	20010110	EP 1999-914443	19990322
R: BE, CH, DE, DK, ES, FR, GB, IT, LI, NL, SE, IE				
JP 2002508942	T2	20020326	JP 2000-537445	19990322
US 6514495	B1	20030204	US 1999-273871	19990322

US 2002127218	A1	20020912	US 2002-83452	20020226
US 6689358	B2	20040210		

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=> s ((short j?) or (short, j?))/au
L8         1091 ((SHORT J?) OR (SHORT, J?))/AU

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L9           11 L8 AND PHYTASE

=> dup rem l9
PROCESSING COMPLETED FOR L9
L10            9 DUP REM L9 (2 DUPLICATES REMOVED)

=> d 1-9 ti

L10  ANSWER 1 OF 9  CAPLUS  COPYRIGHT 2004 ACS on STN  DUPLICATE 1
TI   Protein and cDNA sequences of a Escherichia coli B. Phytase and
     use in foodstuffs to improve the feeding value of phytate rich ingredients

L10  ANSWER 2 OF 9  CAPLUS  COPYRIGHT 2004 ACS on STN
TI   Sequences of modified recombinant Escherichia coli phytases and methods of
     making and using them

L10  ANSWER 3 OF 9  CAPLUS  COPYRIGHT 2004 ACS on STN
TI   Enhancing the thermal tolerance and gastric performance of a microbial
     phytase for use as a phosphate-mobilizing monogastric-feed
     supplement

L10  ANSWER 4 OF 9  CAPLUS  COPYRIGHT 2004 ACS on STN
TI   Production, expression and sequence of modified recombinant Escherichia
     coli phytase with enhanced thermostability and proteolytic
     resistance for use in foodstuffs

L10  ANSWER 5 OF 9  CAPLUS  COPYRIGHT 2004 ACS on STN
TI   New phytases identified by sequence homology and their use in food
     processing to lower phytic acid content

L10  ANSWER 6 OF 9  CAPLUS  COPYRIGHT 2004 ACS on STN
TI   Recombinant bacterial phytases and their use for degradation of food
     phytates.

L10  ANSWER 7 OF 9  CAPLUS  COPYRIGHT 2004 ACS on STN  DUPLICATE 2
TI   Recombinant phytase from Escherichia coli B and its use for
     improving nutritional value of phytate-containing animal feed

L10  ANSWER 8 OF 9  CAPLUS  COPYRIGHT 2004 ACS on STN
TI   Recombinant bacterial phytases and uses for improved nutritional value of
     phytate-containing foodstuffs

L10  ANSWER 9 OF 9  CAPLUS  COPYRIGHT 2004 ACS on STN
TI   Recombinant bacterial phytases and their uses for improving nutritional
     value of phytate-containing feed


=> d 1-9 so

L10  ANSWER 1 OF 9  CAPLUS  COPYRIGHT 2004 ACS on STN  DUPLICATE 1
SO   U.S., 48 pp., Cont.-in-part of U.S. 6,183,740.
     CODEN: USXXAM

L10  ANSWER 2 OF 9  CAPLUS  COPYRIGHT 2004 ACS on STN
SO   U.S. Pat. Appl. Publ., 74 pp., Cont.-in-part of U.S. Ser. No. 866,379.
     CODEN: USXXCO

L10  ANSWER 3 OF 9  CAPLUS  COPYRIGHT 2004 ACS on STN
SO   Applied and Environmental Microbiology (2004), 70(5), 3041-3046
     CODEN: AEMIDF; ISSN: 0099-2240
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L10  ANSWER 4 OF 9  CAPLUS  COPYRIGHT 2004 ACS on STN
SO   U.S. Pat. Appl. Publ., 113 pp., Cont.-in-part of U.S. Ser. No. 866,379.
     CODEN: USXXCO

L10  ANSWER 5 OF 9  CAPLUS  COPYRIGHT 2004 ACS on STN
SO   PCT Int. Appl., 208 pp.
     CODEN: PIXXD2

L10  ANSWER 6 OF 9  CAPLUS  COPYRIGHT 2004 ACS on STN
SO   U.S. Pat. Appl. Publ., 62 pp., Cont.-in-part of U.S. Ser. No. 580,515.
     CODEN: USXXCO

L10  ANSWER 7 OF 9  CAPLUS  COPYRIGHT 2004 ACS on STN  DUPLICATE 2
SO   U.S., 33 pp., Cont.-in-part of U.S. Ser. No. 291,931.
     CODEN: USXXAM

L10  ANSWER 8 OF 9  CAPLUS  COPYRIGHT 2004 ACS on STN
SO   PCT Int. Appl., 170 pp.
     CODEN: PIXXD2

L10  ANSWER 9 OF 9  CAPLUS  COPYRIGHT 2004 ACS on STN
SO   PCT Int. Appl., 147 pp.
     CODEN: PIXXD2


=> d 1-9 pi

L10  ANSWER 1 OF 9  CAPLUS  COPYRIGHT 2004 ACS on STN  DUPLICATE 1
     PATENT NO.          KIND  DATE            APPLICATION NO.  DATE
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PI   US 6720014          B1    20040413        US 2000-580515   20000525
     US 5876997          A     19990302        US 1997-910798   19970813
     US 6110719          A     20000829        US 1999-259214   19990301
     US 6190897          B1    20010220        US 1999-291931   19990413
     US 6183740          B1    20010206        US 1999-318528   19990525
     WO 2001090333       A2    20011129        WO 2001-US17118  20010524
     WO 2001090333       A3    20030123
         W:  AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN,
             CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,
             GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR,
             LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT,
             RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ,
             VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM
         RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY,
             DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF,
             BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG
     US 2002136754       A1    20020926        US 2001-866379   20010524
     EP 1301592          A2    20030416        EP 2001-937752   20010524
         R:  AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,
             IE, SI, LT, LV, FI, RO, MK, CY, AL, TR
     JP 2003534009       T2    20031118        JP 2001-587129   20010524
     BR 2001011124       A     20040225        BR 2001-11124    20010524
     US 2003049815       A1    20030313        US 2001-34985    20011221
     US 2003103958       A1    20030605        US 2002-156660   20020524
     US 2003232041       A1    20031218        US 2003-430356   20030505
     US 2004091968       A1    20040513        US 2003-601319   20030620

L10  ANSWER 2 OF 9  CAPLUS  COPYRIGHT 2004 ACS on STN
     PATENT NO.          KIND  DATE            APPLICATION NO.  DATE
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PI   US 2004091968       A1    20040513        US 2003-601319   20030620
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	US 6190897	B1	20010220	US 1999-291931	19990413
	US 6183740	B1	20010206	US 1999-318528	19990525
	US 6720014	B1	20040413	US 2000-580515	20000525
	US 2002136754	A1	20020926	US 2001-866379	20010524

L10 ANSWER 3 OF 9 CAPLUS COPYRIGHT 2004 ACS on STN

L10 ANSWER 4 OF 9 CAPLUS COPYRIGHT 2004 ACS on STN

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2003103958	A1	20030605	US 2002-156660	20020524
	US 5876997	A	19990302	US 1997-910798	19970813
	US 6110719	A	20000829	US 1999-259214	19990301
	US 6190897	B1	20010220	US 1999-291931	19990413
	US 6183740	B1	20010206	US 1999-318528	19990525
	US 6720014	B1	20040413	US 2000-580515	20000525
	US 2002136754	A1	20020926	US 2001-866379	20010524

L10 ANSWER 5 OF 9 CAPLUS COPYRIGHT 2004 ACS on STN

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2002048332	A2	20020620	WO 2001-US48774	20011212
	WO 2002048332	C2	20030424		
	WO 2002048332	A3	20030626		

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RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

	AU 2002030953	A5	20020624	AU 2002-30953	20011212
	US 2003101476	A1	20030529	US 2001-21723	20011212

L10 ANSWER 6 OF 9 CAPLUS COPYRIGHT 2004 ACS on STN

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2002136754	A1	20020926	US 2001-866379	20010524
	US 5876997	A	19990302	US 1997-910798	19970813
	US 6110719	A	20000829	US 1999-259214	19990301
	US 6190897	B1	20010220	US 1999-291931	19990413
	US 6183740	B1	20010206	US 1999-318528	19990525
	US 6720014	B1	20040413	US 2000-580515	20000525
	WO 2002095003	A2	20021128	WO 2002-US16482	20020524

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

	US 2003103958	A1	20030605	US 2002-156660	20020524
	US 2004091968	A1	20040513	US 2003-601319	20030620

L10 ANSWER 7 OF 9 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 6183740	B1	20010206	US 1999-318528	19990525
	US 5876997	A	19990302	US 1997-910798	19970813

US 6110719	A	20000829	US 1999-259214	19990301	
US 6190897	B1	20010220	US 1999-291931	19990413	
WO 2000071728	A1	20001130	WO 2000-US14846	20000525	

W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG

EP 1180152	A1	20020220	EP 2000-937932	20000525

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO

BR 2000010946	A	20020416	BR 2000-10946	20000525
JP 2003500057	T2	20030107	JP 2000-620105	20000525
US 6720014	B1	20040413	US 2000-580515	20000525
US 2001055788	A1	20011227	US 2001-777566	20010205
US 2002136754	A1	20020926	US 2001-866379	20010524
ZA 2001009428	A	20030317	ZA 2001-9428	20011115
US 2003049815	A1	20030313	US 2001-34985	20011221
US 2003103958	A1	20030605	US 2002-156660	20020524
US 2003232041	A1	20031218	US 2003-430356	20030505
US 2004091968	A1	20040513	US 2003-601319	20030620

L10 ANSWER 8 OF 9 CAPLUS COPYRIGHT 2004 ACS on STN

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI WO 2001090333	A2	20011129	WO 2001-US17118	20010524
WO 2001090333	A3	20030123		

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RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG

US 6720014	B1	20040413	US 2000-580515	20000525
EP 1301592	A2	20030416	EP 2001-937752	20010524

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR

JP 2003534009	T2	20031118	JP 2001-587129	20010524
BR 2001011124	A	20040225	BR 2001-11124	20010524

L10 ANSWER 9 OF 9 CAPLUS COPYRIGHT 2004 ACS on STN

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI WO 2000071728	A1	20001130	WO 2000-US14846	20000525

W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG

US 6183740	B1	20010206	US 1999-318528	19990525
EP 1180152	A1	20020220	EP 2000-937932	20000525

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO

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     JP 2003500057     T2   20030107       JP 2000-620105   20000525


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L11        126 ((MATHUR, E?) OR (MATHUR E?))/AU

=> s l11 and phytase
L12          3 L11 AND PHYTASE

=> dup rem l12
PROCESSING COMPLETED FOR L12
L13          3 DUP REM L12 (0 DUPLICATES REMOVED)

=> d 1-3 ti

L13  ANSWER 1 OF 3  CAPLUS  COPYRIGHT 2004 ACS on STN
TI   Production, expression and sequence of modified recombinant Escherichia
     coli phytase with enhanced thermostability and proteolytic
     resistance for use in foodstuffs

L13  ANSWER 2 OF 3  CAPLUS  COPYRIGHT 2004 ACS on STN
TI   New phytases identified by sequence homology and their use in food
     processing to lower phytic acid content

L13  ANSWER 3 OF 3  CAPLUS  COPYRIGHT 2004 ACS on STN
TI   Recombinant bacterial phytases and their use for degradation of food
     phytates.


=> s ((richardson, t?) or (richardson t?))/AU
L14       1315 ((RICHARDSON, T?) OR (RICHARDSON T?))/AU

=> s l14 and phytase
L15          1 L14 AND PHYTASE

=> d ti

L15  ANSWER 1 OF 1  CAPLUS  COPYRIGHT 2004 ACS on STN
TI   New phytases identified by sequence homology and their use in food
     processing to lower phytic acid content


=> d pi

L15  ANSWER 1 OF 1  CAPLUS  COPYRIGHT 2004 ACS on STN
     PATENT NO.        KIND  DATE           APPLICATION NO.  DATE
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PI   WO 2002048332     A2    20020620       WO 2001-US48774  20011212
     WO 2002048332     C2    20030424
     WO 2002048332     A3    20030626
         W:  AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN,
             CO, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM,
             HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS,
             LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO,
             RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN,
             YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM
         RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, CH,
             CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR,
             BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG
     AU 2002030953     A5    20020624       AU 2002-30953    20011212
     US 2003101476     A1    20030529       US 2001-21723    20011212
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number of left parentheses.

=> s ((robertson, d?) or (robertson d?))/au
L16       4876 ((ROBERTSON, D?) OR (ROBERTSON D?))/AU

=> s l16 and phytase
L17          2 L16 AND PHYTASE

=> dup rem l17
PROCESSING COMPLETED FOR L17
L18           2 DUP REM L17 (0 DUPLICATES REMOVED)

=> d 1-2 ti

L18  ANSWER 1 OF 2  CAPLUS  COPYRIGHT 2004 ACS on STN
TI   Enhancing the thermal tolerance and gastric performance of a microbial
     phytase for use as a phosphate-mobilizing monogastric-feed
     supplement

L18  ANSWER 2 OF 2  CAPLUS  COPYRIGHT 2004 ACS on STN
TI   New phytases identified by sequence homology and their use in food
     processing to lower phytic acid content


=> s ((barton, n?) or (barton n?))/au
L19        472 ((BARTON, N?) OR (BARTON N?))/AU

=> s l19 and phytase
L20          8 L19 AND PHYTASE

=> dup rem l20
PROCESSING COMPLETED FOR L20
L21           7 DUP REM L20 (1 DUPLICATE REMOVED)

=> d 1-7 ti

L21  ANSWER 1 OF 7  CAPLUS  COPYRIGHT 2004 ACS on STN
TI   Sequences of modified recombinant Escherichia coli phytases and methods of
     making and using them

L21  ANSWER 2 OF 7  CAPLUS  COPYRIGHT 2004 ACS on STN
TI   Enhancing the thermal tolerance and gastric performance of a microbial
     phytase for use as a phosphate-mobilizing monogastric-feed
     supplement

L21  ANSWER 3 OF 7  CAPLUS  COPYRIGHT 2004 ACS on STN
TI   Production, expression and sequence of modified recombinant Escherichia
     coli phytase with enhanced thermostability and proteolytic
     resistance for use in foodstuffs

L21  ANSWER 4 OF 7  CAPLUS  COPYRIGHT 2004 ACS on STN  DUPLICATE 1
TI   Safety evaluation of a phytase, expressed in Schizosaccharomyces
     pombe, intended for use in animal feed

L21  ANSWER 5 OF 7  CAPLUS  COPYRIGHT 2004 ACS on STN
TI   New phytases identified by sequence homology and their use in food
     processing to lower phytic acid content

L21  ANSWER 6 OF 7  CAPLUS  COPYRIGHT 2004 ACS on STN
TI   Recombinant bacterial phytases and their use for degradation of food
     phytates.
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L21 ANSWER 7 OF 7 CAPLUS COPYRIGHT 2004 ACS on STN
TI Recombinant bacterial phytases and uses for improved nutritional value of phytate-containing foodstuffs

=> d 4 ab

L21 ANSWER 4 OF 7 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 1
AB BD006 **phytase** is the product of the Escherichia coli B appA gene expressed in Schizosaccharomyces pombe strain ASP595-1. This enzyme preparation is intended for use in animal feed applications where it improves the bioavailability of phosphate for monogastric animals. BD006 **phytase** was tested as an unrefined (DV006U) and a refined (DV006R) preparation for its effects on genotoxicity and in acute, inhalation and subchronic toxicity studies. Dosages ranged from 5000 μg/plate for in vitro toxicity studies to a high of 2000X for oral in vivo toxicity studies. The highest oral dose tested (2000X) is 2000 times the highest expected consumption of product by poultry or swine (X=50 units of **phytase** per kg bwt/day). There was no genotoxicity or any in vivo toxicity reported which could be directly related to systemic effects of the product. Other addnl. safety studies conducted were devoid of any relevant toxicity. The historic safety profile of the production organism S. pombe, and the results of the toxicity studies presented herein, attest to the safety of BD006 **phytase** for use in animal feed applications.

=> d 4 so

L21 ANSWER 4 OF 7 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 1
SO Regulatory Toxicology and Pharmacology (2003), 37(2), 286-292
CODEN: RTOPDW; ISSN: 0273-2300

=> d 5 ab

L21 ANSWER 5 OF 7 CAPLUS COPYRIGHT 2004 ACS on STN
AB Novel phytases that can be used to remove phytic acids from foods during food processing are identified and characterized. Genes encoding the enzymes have been cloned for use in manufacture of the enzyme for industrial use. In particular, the **phytase** of the present invention can be used in foodstuffs to improve the feeling value of phytate rich ingredients.

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L21 ANSWER 5 OF 7 CAPLUS COPYRIGHT 2004 ACS on STN
SO PCT Int. Appl., 208 pp.
CODEN: PIXXD2

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L21 ANSWER 5 OF 7 CAPLUS COPYRIGHT 2004 ACS on STN

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2002048332	A2	20020620	WO 2001-US48774	20011212
	WO 2002048332	C2	20030424		
	WO 2002048332	A3	20030626		

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO,

RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN,
YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, CH,
CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR,
BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

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US	2003101476	A1	20030529	US 2001-21723	20011212